Plant Sociology 60(1) 2023, 51–65 | DOI 10.3897/pls2023601/05

PENSOFT

Società Italiana di Scienza della Vegetazione (SISV)

New national and regional Annex I Habitat records: from #60 to #82

Antonio Morabito[1], Marina Allegrezza[2], Claudia Angiolini[3,4], Simonetta Bagella[5], Giuseppe Bazan[6], Federica Bonini[7], Mattia Camilletti[2], Silvia Cannucci[3,4], Maria Carmela Caria[5], Alessandro Crisafulli[8], Leopoldo de Simone[3], Assunta Esposito[9], Emanuele Fanfarillo[3,4], Emmanuele Farris[5], Massimiliano Ferrarato[10], Tiberio Fiaschi[3], Lorenzo Gianguzzi[11,12], Daniela Gigante[7], Riccardo Guarino[6], Vincenzo Ilardi[6], Michele Lonati[13], Andrea Mainetti[14], Francesco Mascia[3,15], Giacomo Mei[16], Carmelo Maria Musarella[1], Glauco Patera[17], Veronica Ranno[18], Maria Ravo[19], Saverio Sciandrello[18], Giovanni Spampinato[1], Adriano Stinca[9], Gianmarco Tavilla[18], Giulio Tesei[2], Giovanni Rivieccio[5]

1 *Department of Agriculture, Mediterranean University of Reggio Calabria, Loc. Feo di Vito snc, I-89122 Reggio Calabria, Italy*
2 *Department of Agricultural, Food and Environmental Sciences, Marche Polytechnic University, Via Brecce Bianche, I-60131 Ancona, Italy*
3 *Department of Life Sciences, University of Siena, Via P.A. Mattioli 4, I-53100 Siena, Italy*
4 *NBFC, National Biodiversity Future Center, I-90133 Palermo, Italy*
5 *Department of Chemical, Physical, Mathematical and Natural Sciences, University of Sassari, Via Vienna 2, I-07100 Sassari, Italy*
6 *Department of Biological, Chemical, and Pharmaceutical Sciences and Technologies, University of Palermo, Via Archirafi 38, I-90123, Palermo, Italy*
7 *Department of Agriculture, Food and Environmental Sciences, University of Perugia, Borgo XX giugno 74, I-06121 Perugia, Italy*
8 *Department ChiBioFarAm, University of Messina, Via Stagno d'Alcontres, I-98100 Messina, Italy*
9 *Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, University of Campania Luigi Vanvitelli, Via Antonio Vivaldi 43, I-81100 Caserta, Italy*
10 *Department of Geology and Geological Instability, Regional Agency for Protection of Environment (ARPA), Via Pio VII 9, I-10135 Torino, Italy*
11 *Department of Agricultural, Food and Forest Sciences, University of Palermo, Viale delle Scienze Bldg. 5, I-90128 Palermo, Italy*
12 *NBFC, National Biodiversity Future Center, Palermo I-90133, Italy*
13 *Department of Agricultural, Forest and Food Sciences (DISAFA), University of Torino, Largo Paolo Braccini 2, I-10095 Grugliasco, Torino, Italy*
14 *Biodiversity service and scientific research, Gran Paradiso National Park, fraz. Valnontey 44, I-11012, Cogne, Italy*
15 *Independent researcher*
16 *Department of Agri-environmental and Territorial Sciences, University of Bari "Aldo Moro", Via G. Amendola 165/A, I-70126, Bari, Italy*
17 *Studio Fagus, Via San Giuseppe 36, Concorezzo, I-20863 Monza e della Brianza, Italy*
18 *Department of Biological, Geological and Environmental Sciences, University of Catania, Via Antonino Longo 19, I-95125 Catania, Italy*
19 *Genomix4Life Srl, Via Salvator Allende 43/L, I-84081 Baronissi, Italy*

Corresponding author: Giovanni Rivieccio (giorivieccio@gmail.com)

Subject editor: Daniele Viciani ♦ **Received** 3 June 2023 ♦ **Accepted** 27 June 2023 ♦ **Published** 30 June 2023

Abstract

New Italian data on the distribution of the Annex I Habitats are reported in this contribution. Specifically, 8 new occurrences in Natura 2000 sites are presented and 49 new cells are added in the EEA 10 km × 10 km reference grid. The new data refer to the Italian administrative regions of Campania, Calabria, Marche, Piedmont, Sardinia, Sicily, Tuscany and Umbria. Relevés and figures are provided as Supplementary material respectively 1 and 2.

Keywords

1240, 1310, 1420, 2250*, 3130, 3220, 3260, 3270, 3280, 4090, 6110*, 6430, 7210*, 8210, 91AA*, 91B0, 91E0*, 92A0, 92D0, 9330

Copyright *Antonio Morabito et al.* This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Introduction

This is the eighth contribution reporting records of new occurrences of Annex I Habitats in Europe. By comparing the results of the 4th Report ex-Art. 17 of Annex I Habitat Monitoring in Europe (Eionet 2019), these cell occurrences are newly recorded for Italy. The related phytosociological relevés of each contribution are reported and archived in the Italian database "VegItaly" (Gigante et al. 2012; Landucci et al. 2012).

Habitats records

Following the standard format of Gigante et al. (2019b), all species data, site data and descriptions of the new habitat records are hereafter provided. We report a synthetic overview in Tab. 1, offering an overview of the novelties. We used the open source QGIS Geographic information System (QGIS.org 2023) for mapping purposes. All the tables referring to the new relevés are provided as Supplementary Material 1. All the figures and the maps with the new cell distribution in Italy and closeup pictures of vegetation types are provided as Supplementary Material 2.

#60. Annex I Habitat: 1240 Vegetated sea cliffs of the Mediterranean coasts with endemic *Limonium* spp. (Stinca A, Mei G, Ravo M, Esposito A)

EUNIS Classification system: B3.3 - Rocky habitats (cliffs, beaches and islets) with halophitic vegetation
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Crithmo-Limonietum remotispiculi* Bartolo, Brullo and Signorello 1989, *Crithmo maritimi-Staticion* Molinier 1934, *Crithmo maritimi-staticetalia* Molinier 1934, *Crithmo maritimi-Staticetea* Br.-Bl. in Br.-Bl., Roussine and Nègre 1952 em. Biondi 2007 (Bartolo et al. 1989, Biondi and Blasi 2015).
Geographic information: Italy, Calabria, Cosenza, Scalea, between loc. Grotta della Pecora and loc. Lainello, 8 m a.s.l., Coordinates: 39.819750 N, 15.783111 E (Suppl. Material 1, Table S1, Rel. 1); 10 m a.s.l., Coordinates: 39.819472 N, 15.783250 E (Suppl. Material 1, Table S1, Rel. 2); 8 m a.s.l. Coordinates: 39.819068 N, 15.783341 E (Suppl. Material 1, Table S1, Rel. 3); 5 m a.s.l., Coordinates: 39.818958 N, 15.783439 E (Suppl. Material 1, Table S1, Rel. 4); 5 m a.s.l., Coordinates: 39.818705 N, 15.783888 E (Suppl. Material 1, Table S1, Rel. 5).
Cells ID in the EEA reference grid: 10kmE481N187 (Suppl. Material 2, Figure S1).
Natura 2000 Site Code: Currently not included in any Natura 2000 Site.
Phytosociological table: Suppl. Material 1, Table S1, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).
Notes: In the current state of knowledge, within the alliance *Crithmo maritimi-Staticion* Molinier 1934, 14 halophilous associations have been recognized for Italy especially for the presence of the different species of *Limonium* (Bartolo et al. 1989). Our relevés describe a chamaephytic plant community with *Limonium remotispicumum* (Lacaita) Pignatti discovered near the southern limit of species distribution (Suppl. Material 2, Figure S2). Indeed, it is a rare Italian endemic vascular plant known from Sorrento Peninsula (central Campania) to Cirella Island (northern Calabria) where it grows only on Tyrrhenian coastal cliffs. The studied vegetation is threatened by human activities such as trampling and waste dumping. Particularly, the absence of *Crithmum maritimum* L., a species generally abundant in the habitat 1240 along the rocky coasts of southern Italy, also seems to be related to negative human activities.

#61 Annex I Habitat: 1310 *Salicornia* and other annuals colonizing mud and sand (Mascia F)

EUNIS Classification system: A2.6513 - Salicornia spp. pioneer saltmarshes
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Cressetum creticae* Brullo & Furnari 1976, *Thero-Suaedion* Br.-Bl. in Br.-Bl., Roussine and Nègre 1952, *Thero-Suaedetalia* Br.-Bl. and O. Bolòs 1958, *Thero-Salicornietea* Pignatti 1953 em. R.Tx. 1974 (Biondi and Blasi 2015).
Geographic information: Italy, Sardinia, Sud Sardegna, Ex Stagno di Serrenti, 94 m a.s.l., Coordinates: 39.470955 N, 8.981005 E (Suppl. Material 1, Table S2, Rel. 1); Italy, Sardinia, Sud Sardegna, Serdiana, Su stani saliu, 100 m a.s.l., Coordinates: 39.354386 N, 9.119117 E (Suppl. Material 1, Table S2, Rel. 2).
Cell ID in the EEA reference grid: 10kmE423N182; 10kmE424N180 (Suppl. Material 2, Figure S3).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Suppl. Material 1, Table S2, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).
Notes: Therophytic, halo-nitrophilous communities referred to *Cressetum creticae* Brullo and Furnari 1976 (*Thero-Suaedion*, *Thero-Suaedetalia*, *Thero-Salicornietea*). Such vegetation develops on halomorphic, silty-clayly substrates on the bottom of inland endorheic basins, flooded from late autumn to late spring, and completely dried up and cracked in summer. The formation has

Table 1. Synthetic overview of the newly reported data.

Hab ID	Hab name	Cell ID	Country	BR	N2000 Site	Authors
1240	Vegetated sea cliffs of the Mediterranean coasts with endemic *Limonium* spp.	10kmE481N187	Italy	MED	-	Stinca A., Mei G., Ravo M., Esposito A.
1310	*Salicornia* and other annuals colonizing mud and sand	10kmE423N182, 10kmE424N180	Italy	MED	-	Mascia F.
1420	Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)	10kmE423N182, 10kmE424N180 10kmE473N168	Italy	MED	-	Mascia F. Tavilla G., Ranno V., Crisafulli A.
2250*	Coastal dunes with Juniperus spp.	10kmE486N178	Italy	MED	-	Morabito A., Musarella C.M., Spampinato G.
3130	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*	10kmE448N223	Italy	MED	IT5210020	Bonini F., Gigante D.
3220	Alpine rivers and the herbaceous vegetation along their banks	10kmE412N249	Italy	ALP	IT1201000	Mainetti A, Ferrarato M, Lonati M.
3260	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	10kmE440N217, 10kmE440N226, 10kmE442N226	Italy	MED	-	Fiaschi T., Cannucci S., Fanfarillo E., Angiolini C.
3270	Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation	10kmE444N223	Italy	MED	-	Fiaschi T., Cannucci S., Fanfarillo E., Angiolini C.
3280	Constantly flowing Mediterranean rivers with *Paspalo-Agrostidion* species and hanging curtains of *Salix* and *Populus alba*	10kmE444N223	Italy	MED	-	Fiaschi T., Fanfarillo E., Angiolini C.
4090	Endemic oro-Mediterranean heaths with gorse	10kmE469N166	Italy	MED	ITA020018	Bazan G., Guarino R., Ilardi V.
7210*	Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*	10kmE416N194	Italy	MED	-	Rivieccio G., Caria M.C., Bagella S., Farris E.
6110*	Rupicolous calcareous or basophilic grasslands of the *Alysso-Sedion albi*	10kmE444N223	Italy	MED	-	Fanfarillo E., Fiaschi T., Angiolini C.
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	10kmE444N223	Italy	MED	-	Fanfarillo E., Fiaschi T., Angiolini C.
8210	Calcareous rocky slopes with chasmophytic vegetation	10kmE459N164	Italy	MED	-	de Simone L.
91AA*	Eastern white oak woods	10kmE486N177, 10kmE487N178, 10kmE483N175, 10kmE488N176, 10kmE484N173, 10kmE488N174, 10kmE487N173, 10kmE488N172, 10kmE486N169, 10kmE485N169, 10kmE485N179, 10kmE482N167	Italy	MED	-	Morabito A., Musarella C.M., Spampinato G.
91B0	Thermophilous *Fraxinus angustifolia* wood	10kmE455N225	Italy	CONT	-	Tesei G., Camilletti M., Allegrezza M.
		110kmE478N167, 10kmE477N167, 10kmE478N168			ITA030007, ITA030019	Gianguzzi L., Sciandrello S., Bazan G.
91E0*	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)	10kmE486N178, 10kmE488N174, 10kmE488N178, 10kmE487N177, 10kmE487N175, 10kmE487N176, 10kmE482N170, 10kmE485N171	Italy	MED	IT9340120, IT9350300	Morabito A., Musarella C.M., Spampinato G.
		10kmE443N224			-	Fanfarillo E., Fiaschi T., Cannucci S., Angiolini C.
92A0	*Salix alba* and P*opulus alba* gallerie	10kmE486N178	Italy	MED	-	Morabito A., Musarella C.M., Spampinato G.
92D0	Southern riparian galleries and thickets (*Nerio-Tamaricetea* and *Securinegion tinctoriae*)	10kmE477N190	Italy	MED	IT8050013	Patera G.
9330	*Quercus suber* forests	10kmE485N178, 10kmE487N175, 10kmE489N175	Italy	MED	-	Morabito A., Musarella C.M., Spampinato G.

connections with perennials formations of *Salicornietea fruticosae*.

#62 Annex I Habitat: 1420 Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) (Mascia F)

EUNIS Classification system: A2.5 - Coastal saltmarshes and saline reedbeds
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Arthrocnemion glauci* Rivas-Mart. and Costa M. 1984, *Salicornietalia fruticosae* Br.-Bl. 1933, *Salicornietea fruticosae* Br.-Bl. and Tx. ex A. Bolòs y Vayreda and O. de Bolòs in A. Bolòs & Vayreda 1950 (Biondi and Blasi 2015).
Geographic information: Italy, Sardinia, Sud Sardegna, Ex Stagno di Serrenti, 94 m a.s.l., Coordinates: 39.470955 N, 8.981803 E (Suppl. Material 1, Table S3, Rel.1); Sardinia, Sud Sardegna, Serdiana, Su stani saliu, 104 m a.s.l., Coordinates: 39.35639 N, 9.119761 E (Suppl. Material 1, Table S3, Rel.2).
Cell ID in the EEA reference grid: 10kmE423N182, 10kmE424N180 (Suppl. Material 2, Figure S4).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Suppl. Material 1, Table S3, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).
Notes: The communities detected are referred to *Arthrocnemion glauci* order (Suppl. Material 2, Figure S5). These are often relegated to very small surfaces, along the banks of inland astatic basins with brackish to salt waters, or field ditches of partially reclaimed endorheic ponds. Rarely extending over 5000 m^2, these communities are strongly threatened by long-term land reclamation processes for agricultural purposes, that are leading to the definitive disappearance of the original habitat.

#63. Annex I Habitat: 1420: Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) (Tavilla G, Ranno V, Crisafulli A)

EUNIS Classification system: A2.5 - Coastal saltmarshes and saline reedbeds (Chytrý et al. 2020)
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Salicornion fruticosae* Br.-Bl. 1933, *Salicornietalia fruticosae* Br.-Bl. 1933, *Salicornietea fruticosae* Br.-Bl. & Tx. ex A. Bolos y Vayreda and O. de Bolos in A. Bolos y Vayreda 1950 (Mucina et al. 2016).
Geographic information: Italy, Sicily, Messina, Capo d'Orlando, 3 m a.s.l., Coordinates: 38.165122 N, 14.749621 E (Suppl. Material 1, Table S4, Rels. 1 to 4).
Cells ID in the EEA reference grid: 10kmE473N168 (Suppl. Material 2, Figure S4).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Suppl. Material 1, Table S4, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).
Notes: The habitat has been identified near to Capo d'Orlando (Messina) on Sicily's Tyrrhenian coast. This coastal wetland hosts a halophilous plant community, even though impoverished, characterized by perennial species belonging to the class *Salicornietea fruticosea*. Currently, salt marshes are mostly reported along Sicily's southern and western coasts, with no data for the northern coast (Sciandrello 2020). Therefore, this report represents the first one in the north Sicilian coast.

#64. Annex I Habitat: 2250* Coastal dunes with *Juniperus* spp. (Morabito A, Musarella CM, Spampinato G)

EUNIS Classification system: N1B21 (formerly, B1.631) - Dune prickly juniper thickets (Chytrý et al. 2020).
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Pistacio lentisci-Juniperetum macrocarpae* Caneva, De Marco and Mossa 1981, Juniperion turbinatae Rivas-Martínez 1975 corr. 1987, *Pistacio lentisci-Rhamnetalia alaterni* Riv.-Mart. 1974, *Quercetea ilicis* Br.-Bl. 1947 in Br.-Bl., Roussine and Nègre 1952 (REFERENCE).
Geographic information: Italy, Calabria, Catanzaro, Lamezia Terme, Contrada Maricello, 5 m a.s.l. Coordinates: 38.917158 N, 16.220564 E (Suppl. Material 1, Table S5, Rel. 1).
Cells ID in the EEA reference grid: 10kmE486N178 (Suppl. Material 2, Figure S6).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Suppl. Material 1, Table S5, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).
Notes: The association *Pistacio lentisci-Juniperetum macrocarpae* Caneva, De Marco and Mossa 1981, is a type of dense and intricate psammophilous scrub that constitutes the first woody vegetation colonizing sandy dune. This vegetation has been described for Sardinia region (Caneva et al. 1981) and brought back to Tuscany (Arrigoni et al. 1985; De Dominicis et al. 1988), currently limited in a few coastal stretches not exploited for tourist or residential purposes (Costa and Ercole 2015). The scrub with *Juniperus macrocarpa* Sm. is fundamental for the con-

servation of coastal dunes, as it contributes significantly to the consolidation of coastal sand dunes. In the survey carried out there are invasive alien species including *Acacia saligna* (Labill.) H.L.Wendl, which compromises the structure and conservation of the habitat (Spampinato et al. 2022). These new records report for the first time the *Pistacio lentisci-Juniperetum macrocarpae* association for the Calabria Region, expanding the distribution area of the 2250* habitat in the region.

#65. Annex I Habitat: 3130 Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the *Isoëto-Nanojuncetea* (Bonini F, Gigante D)

EUNIS Classification system: C3.4 - Species-poor beds of low-growing water-fringing or amphibious vegetation
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Callitricho brutiae-Juncetum bulbosi* Gigante, Maneli and Venanzoni 2013, Littorellion uniflorae Koch ex Klika 1935 (syn.: *Eleocharition acicularis* Pietsch 1965), *Littorelletalia uniflorae* Koch ex Tx. 1937, *Littorelletea uniflorae* Br.-Bl. and Tx. ex Westhoff et al. 1946 (Gigante et al. 2013; Mucina et al. 2016).
Geographic information: Precise coordinates are not reported in Gigante et al. (2013), however those relevés refer to the same areas where the new relevés, here reported, have been carried out, i.e. to the close surroundings of the hereafter specified coordinates. Italy, Umbria, Perugia, Castiglione del Lago, Monelli, 275 m a.s.l., Coordinates: 43.165204 N, 11.994307 E [Suppl. Material 1, Table S6, Rel. 1; Tab. 9, Rels 32, 33, 37, 39, 41-43, 46, 49 in Gigante et al. (2013)]; Italy, Umbria, Perugia, Castiglione del Lago, Monelli, 274 m a.s.l., Coordinates: 43.165470 N, 11.994228 E (Suppl. Material 1, Table S6, Rel. 2); Italy, Umbria, Perugia, Castiglione del Lago, SE of Ferretto. 273 m a.s.l., Coordinates: 43.173427 N, 12.000636 E [Suppl. Material 1, Table S6, Rel. 3; Tab. 9, Rels 34-36 in Gigante et al. (2013)]; Italy, Umbria, Perugia, Castiglione del Lago, Podere Marella, 295 m a.s.l., Coordinates: 43.167699 N, 11.971008 E [Suppl. Material 1, Table S6, Rel. 4; Tab. 9, Rels 40, 50-51 in Gigante et al. (2013)]; Italy, Umbria, Perugia, Castiglione del Lago, Le Sette Strade, 271 m a.s.l., Coordinates: 43.160542 N, 12.006662 E [Tab. 9, Rels 38, 44-45, 47-48, 52 in Gigante et al. (2013)].
Cells ID in the EEA reference grid: 10kmE448N223 (Suppl. Material 2, Figure S7).
Natura 2000 Site Code: SAC IT5210020 "Boschi di Ferretto - Bagnolo".
Phytosociological table: Tab. 9 in Gigante et al. (2013); Suppl. Material 1, Table S6, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).
Notes: The habitat is represented by *Juncus bulbosus*- dominated vegetation occurring in 20-40 cm depth temporary ponds with steep borders (Suppl. Material 2, Figure S8). Ponds are found inside glades of *Quercus cerris* and *Q. pubescens* forests (H91M0), in mosaic with waterlogged soils characterized by *Isoëtes histrix* (H3170*) and dry heatlands dominated by *Calluna vulgaris* (H4030) (Pedrotti 1982; Gigante et al. 2007).

Following the syntaxonomic arrangement in Gigante et al. (2013), this perennial amphibious vegetation has been referred to the habitat subtype 22.12 x 22.3 belonging to the *Littorelletalia uniflorae* order.

The recent surveys (Suppl. Material 1, Table S6) have been carried out during the activities of the Integrated project LIFE19 IPE/IT/000015 "LIFE IMAGINE Umbria - Integrated MAnagement and Grant Investments for the N2000 NEtwork in Umbria" (https://www.lifeimagine.eu/): one of the project actions aimed at conserving this habitat type will involve the manual removal of leaf litter deriving from long-lived oak leaves that accumulates in the ponds and leads to their progressive burial.

#66. Annex I Habitat: 3220 Alpine rivers and the herbaceous vegetation along their banks (Mainetti A, Ferrarato M, Lonati M)

EUNIS Classification system: U71 - unvegetated or sparsely vegetated shore with mobile sediments in montane and alpine regions (Chytrý et al. 2020)
Biogeographical Region: Alpine
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Epilobion fleischeri* G. Br.-Bl. ex Br.-Bl. 1950, *Epilobietalia fleischeri* Moor 1958, Thlaspietea rotundifolii Br.-Bl. 1948 (Mucina et al. 2016).
Geographic information: Italy, Piedmont, Valprato Soana, Loc. Azaria, 1550 m a.s.l., Coordinates: 45.55668 N, 7.512335 E (Suppl. Material 1, Table S7, Rels. 1 to 5); Italy, Piedmont, Ronco Canavese, Loc. Lasinetto, 1110 m a.s.l., Coordinates: 45.502689 N, 7.503595 E (Suppl. Material 1, Table S7, Rel. 6).
Cells ID in the EEA reference grid: 10kmE412N249 (Suppl. Material 2, Figure S9).
Natura 2000 Site Code: SAC/SPA IT1201000 'Parco Nazionale Gran Paradiso'
Phytosociological table: Suppl. Material 1, Table S7, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).
Notes: Gravel banks of the *Epilobion fleischeri* are quite frequent in the Alpine ***Biogeographical Region*** and in the Western Alps, although the naturalness of Alpine rivers has been generally compromised over the years. In the SAC/SPA IT1201000 'Parco Nazionale Gran Paradiso' the habitat code 3220 was reported for all cells except for the one reported here. The Orco and Forzo mountain streams actually have limited areas colonised by the habitat, how-

ever these have a significant value because they are set on streams that are not currently artificially regulated by dams or weirs.

#67. Annex I Habitat: 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (Fiaschi T, Cannucci S, Fanfarillo E, Angiolini C)

EUNIS Classification system: C2.3 Permanent non-tidal, smooth-flowing watercourses
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Batrachion fluitantis* Neuhäusl 1959, *Potametalia pectinati* Koch 1926, *Potamogetonetea* Klika in Klika et Novák 1941 (Mucina et al. 2016).
Geographic information: Italy, Tuscany, Grosseto, Grosseto, 2 m a.s.l., Coordinates: 42.7009232 N, 11.0349177 E (Suppl. Material 1, Table S8, Rel. 1); Italy, Tuscany, Firenze, Barberino Tavarnelle, 77 m a.s.l., Coordinates: 43.514722 N, 11.081389 E (Suppl. Material 1, Table S8, Rel. 2); Italy, Tuscany, Siena, Radda in Chianti, 367 m a.s.l., Coordinates: 43.458847 N, 11.34022 E (Suppl. Material 1, Table S8, Rel. 3).
Cell ID in the EEA reference grid: 10kmE440N217 (Tab. 9, Rel. 1); 10kmE440N226 (Suppl. Material 1, Table S8, Rel. 2); 10kmE442N226 (Suppl. Material 1, Table S8, Rel. 3) (Suppl. Material 2, Figure S10).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Supplementary Tabs 11, 13, and 14 in Fanfarillo et al. (2023); Suppl. Material 1, Table S8, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).
Notes: The attribution of vegetation dominated by Potamogeton sp. pl. to the habitat 3260, instead of the habitat 3150 "Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation", is based on the occurrence of such communities in rivers (Rivieccio et al. 2020, 2021; Tavilla et al. 2022).

#68. Annex I Habitat: 3270 Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation (Fiaschi T, Cannucci S, Fanfarillo E, Angiolini C).

EUNIS Classification system: C3.5 - Periodically inundated shores with pioneer and ephemeral vegetation
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Polygono lapathifolii-Xanthietum italici* Pirola et Rossetti 1974, *Chenopodion rubri* (Tx. in Poli et J. Tx., 1960) Hilbig et Jage 1972, *Bidentetalia* Br.-Bl. et Tx. ex Klika et Hadač 1944, *Bidentetea* Tx. et al., ex von Rochow 1951 (Mucina et al. 2016; Fanfarillo et al. 2023).
Geographic information: Italy, Tuscany, Siena, Asciano, 200 m a.s.l. [Supplementary Tab. 15, Rels. 43-45 in Fanfarillo et al. (2023)].
Cell ID in the EEA reference grid: 10kmE444N223 (Suppl. Material 2, Figure S11).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Supplementary Tab. 15 in Fanfarillo et al. (2023).
Notes: In the detection area, this habitat is abundantly present on gravel beds from mid-summer to early autumn (Fanfarillo et al. 2023).

#69. Annex I Habitat: 3280 Constantly flowing Mediterranean rivers with *Paspalo-Agrostidion* species and hanging curtains of *Salix* and *Populus alba* (Fiaschi T, Fanfarillo E, Angiolini C)

EUNIS Classification system: E5.4 - Moist or wet tall-herb and fern fringes and meadows
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Paspalo paspaloidis-Polypogonetum viridis* Br.-Bl. 1952, *Paspalo-Agrostion semiverticillati* Br.-Bl. in Br.-Bl. et al. 1952, *Paspalo-Heleochloetalia* Br.-Bl. ex Rivas Goday 1956, Bidentetea Tx. et al., ex von Rochow 1951 (Mucina et al. 2016; Fanfarillo et al. 2023).
Geographic information: Italy, Tuscany, Siena, Asciano, 200 m a.s.l. [Supplementary Tab. 6, Rel. 15 in Fanfarillo et al. (2023)].
Cell ID in the EEA reference grid: 10kmE444N223 (Suppl. Material 2, Figure S12).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Supplementary Tab. 6 in Fanfarillo et al. (2023).
Notes: In the detection sites, this habitat is mainly represented by short grasslands dominated by *Paspalum distichum*, one of the few alien species colonizing wetlands in the area, which are in general well-preserved (Fanfarillo et al. 2023; Fiaschi et al. 2023).

#70. Annex I Habitat: 4090 Endemic oro-Mediterranean heaths with gorse (Bazan G., Guarino R., Ilardi V.)

EUNIS Classification system: Pal. 31.77 Madonie and Apennine hedgehog-heaths (Hedgehog-heaths formed by *Astragalus* spp. or *Genista* spp., of the mountains of the southern Italian peninsula and Sicily, except Etna).
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Cytiso villosi-Genistion tyrrhenae* Biondi 2000 nom. mut. propos. (= *Calicotomo villosae-Genistion tyrrhenae* Biondi 1997, Coll. Phytosoc. XXVII: 127), *Lavanduletalia stoechadis* Br.-Bl. in Br.-Bl., Molinier and Wagner 1940 em. Rivas-Mart. 1968, *Cisto-Lavanduletea stoechadis* Br.-Bl. in Br.-Bl., Molinier and Wagner 1940 (Mucina et al. 2016)
Geographic information: Italy, Sicily, Palermo, San Mauro Castelverde (Contrada Serra di Prato; Contrada Cerrito), 1151-1164 m a.s.l., Coordinates: 37.927921 N, 14.196102 E (Suppl. Material 1, Table S9, Rel. 1).
Cell ID in the EEA reference grid: 10kmE469N166. (Suppl. Material 2, Figure S13)
Natura 2000 Site Code: ITA020018 "Foce del Fiume Pollina e Monte Tardara".
Phytosociological table: Suppl. Material 1, Table S9, taxonomic nomenclature according to Pignatti et al. (2017-2019).
Notes: *Genista* sect. Voglera (P. Gaertn., B. Mey. and Schreb.) Spach is represented in Sicily by three endemic species: *G. aristata* C. Presl, *G. cupanii* Guss. and *G. madoniensis* Raimondo (Marino et al. 2012). While the first of these has a range extended to all the northern mountain range of Sicily (Madonie, Nebrodi and Peloritani), the other two were hitherto known exclusively from the Madonie Massif. The finding of *G. cupanii* on the heights of San Mauro Castelverde makes it possible to extend the range of this species to the flyschoid substrata of the extreme western outposts of Nebrodi Mountains.

The mountain garrigue here described colonizes summit ridges and eroded slopes, in part resulting from deforestation carried out until a few decades ago. The garrigue is dominated by *Genista cupanii* and a few other elements of the class *Cisto-Lavanduletea*, along with many herbaceous species typical of mountain rangelands of N-Sicily (*Cirsietalia vallis-demonis* Brullo and Grillo 1978; P*oetalia bulbosae* Rivas Goday and Rivas-Mart. in Rivas Goday and Ladero 1970).

From the bioclimatic point of view, the surveyed vegetation falls in a transitional belt between the upper Mesomediterranean unit - in the surveyed area characterized by woods classified into the *Festuco heterophyllae-Quercetum congestae* Brullo and Marcenò 1985 - and the Supramediterranean unit, characterized by the *Arrhenathero nebrodensi-Quercetum cerridis* Brullo, Minissale and Spampinato 1996 (Bazan et al. 2015). Our study area represents the western limit of the distribution range of *Quercus cerris* in Sicily.

The presence of *Helleborus bocconei* subsp. *intermedius*, endemic to north-western Sicily and only sporadically recoded from the Nebrodi Mts. (Giardina et al. 2007) suggests a certain autonomy of the studied garrigue with respect to the *Genista cupanii* associations described for the Madonie Mts., although a more in-depth study would be necessary to better circumstantiate its syntaxonomic framework.

#71. Annex I Habitat: 6110* Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albi (Fanfarillo E, Fiaschi T, Angiolini C).

EUNIS Classification system: E1.1 - Inland sand and rock with open vegetation
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Alysso alyssoidis-Sedion* Oberd. et T. Müller in T. Müller 1961, *Alysso-Sedetalia* Moravec 1967, *Sedo-Scleranthetea* Br.-Bl. 1955 (Mucina et al. 2016; Fanfarillo et al. 2023).
Geographic information: Italy, Tuscany, Siena, Asciano, 200 m a.s.l. [Supplementary Tab. 33, Rels. 88-90 in Fanfarillo et al. (2023)].
Cell ID in the EEA reference grid: 10kmE444N223 (Suppl. Material 2, Figure S14).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Supplementary Tab. 33 in Fanfarillo et al. (2023).
Notes: The presence of alien and ruderal species in the detected habitat shows signs of degradation due to human pressures such as intensive agriculture (Stinca et al. 2021; Fanfarillo et al. 2023).

#72. Annex I Habitat: 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (Fanfarillo E, Fiaschi T, Angiolini C).

EUNIS Classification system: E5.4 - Moist or wet tall-herb and fern fringes and meadows
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Convolvulo-Epilobietum hirsuti* Hilbig, Heinrich et Niemann 1972, *Calystegio-Equisetetum telmateiae* Jovanović 1993, *Senecionion fluviatilis* Tx. ex Moor 1958, Convolvuletalia sepium Tx. ex Moor

1958, *Epilobietea angustifolii* Tx. et Preising ex von Rochow 1951 (Mucina et al. 2016; Fanfarillo et al. 2023).
Geographic information: Italy, Tuscany, Siena, Asciano, 200 m a.s.l. [Supplementary Tab. 16, Rel. 46 in Fanfarillo et al. (2023)].
Cell ID in the EEA reference grid: 10kmE444N223 (Suppl. Material 2, Figure S15).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Supplementary Tab. 16 in Fanfarillo et al. (2023).
Notes: The presence of the habitat was recorded only in one site of limited extension (Fanfarillo et al. 2023).

#73. Annex I Habitat: 7210* Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* (Rivieccio G, Caria MC, Bagella S, Farris E)

EUNIS Classification system: D5.24 Fen *Cladium mariscus* beds (wider).
Biogeographical Region: Mediterranean
National Habitat Checklist of reference : Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Magnocaricion elatae* Koch 1926, *Magnocaricetalia elatae* Pignatti 1953, *Phragmito australis-Magnocaricetea elatae* Klika in Klika and Novák 1941 (Biondi and Blasi, 2015; Venanzoni et al. 2018).
Geographic information: Italy, Sardinia, Sassari, Alghero, Sant'Imbenia, 2 m a.s.l., Coordinates: 40.619097 N, 8.197149 E (Suppl. Material 1, Table S10, Rel. 1); Coordinates: 40.619113 N, 8.197532 E (Suppl. Material 1, Table S10, Rel. 2); Coordinates: 40.619130N, 8.197467 E (Suppl. Material 1, Table S10, Rel. 3).
Cells ID in the EEA reference grid: 10kmE416N194 (Suppl. Material 2, Figure S16).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Suppl. Material 1, Table S10, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).
Notes: This is the third record of the habitat 7210* in Sardinia region (Gigante et al. 2019a; Gianguzzi et al. 2020). The site is located close to Natura 2000 Site ZSC ITB010042 "Capo Caccia (con le isole Foradada e Piana) e Punta del Giglio". The vegetation structure is characterized by the presence of *Cladium mariscus* and *Phragmites australis*. This site represents the last or one of the last sites for several plant species in NW Sardinia coastal areas (*Euphorbia hirsuta*, *Juncus subnodulosus*, *Ranunculus macrophyllus*, among others), and it is important also for animals like *Circus aeruginosus* and *Emys orbicularis* (this one probably extinct less than 10 years ago). This fen receives fresh water during all year from an underground karstic system.

#74. Annex I Habitat: 8210 Calcareous rocky slopes with chasmophytic vegetation (de Simone L)

EUNIS Classification system: H3.2 - Basic and ultra-basic inland cliffs
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Dianthion rupicolae* Brullo & Marcenò 1979, *Asplenietalia glandulosi* Br.-Bl. & Meier in Meier & Br.-Bl. 1934, *Asplenietea trichomanis* (Br.-Bl. in Meier & Br.-Bl. 1934) Oberdorfer 1977 (Biondi and Blasi 2015; Brullo and Marcenò 1979).
Geographic information: Italy, Sicily, Palermo, Monte Maranfusa, 300 m a.s.l., Coordinates: 37.855908 N, 13.133745 E (Suppl. Material 1, Table S11, Rel.1); 37.855148 N, 13.131571 E (Suppl. Material 1, Table S11, Rel. 2); 37.85593N 13.13403 E (Suppl. Material 1, Table S11, Rel.3).
Cells ID in the EEA reference grid: 10kmE459N164 (Suppl. Material 2, Figure S17).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Suppl. Material 1, Table S11, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).
Notes: The relevées have been carried out in the northern slopes of the mountain, where the habitat 8210 is currently present.

#75. Annex I Habitat: 91AA* Eastern white oak woods (Morabito A, Musarella CM, Spampinato G)

EUNIS Classification system: T1932 (formerly, G1.732) - Italo-Sicilian Quercus pubescens woods (Chytrý et al. 2020).
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Erico arboreae-Quercion ilicis* Brullo, Di Martino and Marcenò 1977; *Quercetalia ilicis* Br.-Bl. ex Molinier 1934; *Quercetea ilicis* Br.-Bl. in Br.-Bl., Roussine and Nègre 1952 (Biondi and Blasi 2015).
Geographic information: Italy, Calabria, Catanzaro, Gizzeria, Contrada Jacona, 75 m a.s.l., Coordinates: 38.841122 N, 16.290958 E (Suppl. Material 1, Table S12, Rel. 1); Italy, Calabria, Catanzaro, Serrastretta Timpone Chianta, 393 m a.s.l., Coordinates: 38.956261 N, 16.413381 E (Suppl. Material 1, Table S12, Rel. 2); Italy, Calabria, Vibo Valentia, Parghelia, S. Antonio, 89 m a.s.l., Coordinates: 38.678453 N, 15.917989 E (Suppl. Material 1, Table S12, Rel. 3); Italy, Calabria, Catanzaro, Cenadi, Contrada Griffi, 485 m a.s.l. Coordinates: 38.716733 N, 16.415092 E

(Suppl. Material 1, Table S12, Rel. 4); Italy, Calabria, Vibo Valentia, Nicotera, S. Francesco, 116 m a.s.l., Coordinates: 38.552583 N, 15.931750 E (Suppl. Material 1, Table S12, Rel. 5); Italy, Calabria, Catanzaro, Santa Caterina dello Ionio, Monte Cervaro, 1176 m a.s.l., Coordinates: 38.561517 N, 16.440864 E (Suppl. Material 1, Table S12, Rel. 6); Italy, Calabria, Catanzaro, Isca sullo Ionio, Le Baracche , 1007 m a.s.l., Coordinates: 38.576092 N, 16.446147 E (Suppl. Material 1, Table S12, Rel. 7);); Italy, Calabria, Catanzaro, Isca sullo Ionio, Le Baracche , 1021 m a.s.l., Coordinates: 38.577169 N, 16.445275 E (Suppl. Material 1, Table S12, Rel. 8); Italy, Calabria, Vibo Valentia, Nardodipace, Albani , 672 m a.s.l., Coordinates: 38.451739 N, 16.348911 E (Suppl. Material 1, Table S12, Rel. 9); Italy, Calabria, Vibo Valentia, Nardodipace, Albani , 662 m a.s.l., Coordinates: 38.451222 N, 16.349028 E (Suppl. Material 1, Table S12, Rel. 10); Italy, Calabria, Reggio Calabria, Caulonia, Rovera, 65 m a.s.l., Coordinates: 38.389144 N, 16.397900 E (Suppl. Material 1, Table S12, Rel. 11); Italy, Calabria, Reggio Calabria, Benestare, Fiumara Careri, 45 m a.s.l., Coordinates: 38.156086 N, 16.128778 E (Suppl. Material 1, Table S12, Rel. 12); Italy, Calabria, Reggio Calabria, San Luca, Brancato, 205 m a.s.l., Coordinates: 38.135914 N, 16.050669 E (Suppl. Material 1, Table S12, Rel. 13); Italy, Calabria, Reggio Calabria, Motta San Giovanni, Castello di S. Aniceto (rud.i), 591 m a.s.l. Coordinates: 38.025456 N, 15.705636 E (Suppl. Material 1, Table S12, Rel. 14).

Cells ID in the EEA reference grid: 10kmE486N177 (Tab. 13, Rel. 1), 10kmE487N178 (Suppl. Material 1, Table S12, Rel. 2), 10kmE483N175 (Suppl. Material 1, Table S12, Rel. 3), 10kmE488N176 (Suppl. Material 1, Table S12, Rel. 4), 10kmE484N173 (Suppl. Material 1, Table S12, Rel. 5), 10kmE488N174 (Suppl. Material 1, Table S12, Rels. 5, 7, 8), 10kmE487N173 (Suppl. Material 1, Table S12, Rels 9, 10), 10kmE488N172 (Suppl. Material 1, Table S12, Rel. 11), 10kmE486N169 (Suppl. Material 1, Table S12, Rel. 12), 10kmE485N169 (Suppl. Material 1, Table S12, Rel. 13), 10kmE485N179 (Suppl. Material 1, Table S12, Rel. 14), 10kmE482N167 (Suppl. Material 1, Table S12, Rel. 15) (Suppl. Material 2, Figure S18).

Natura 2000 Site Code: currently not included in any Natura 2000 Site.

Phytosociological table: Suppl. Material 1, Table S12, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).

Notes: In the Calabria Region, the group of *Quercus pubescens* L. has remarkable forestry importance and has been interpreted differently by various authors who have dealt with the taxonomy of this species (Musarella et al. 2018; Di Pietro et al. 2020, 2021). Brullo et al. (2001) attributed the acidophilous thermo-xerophilous oaks woods of Calabria to the *Erico arboreae-Quercetum virgilianae* (Brullo and Marcenò 1985), an association located in the thermo and meso Mediterranean belt. Several authors claim that the forest coenoses with *Quercus pubescens* s.l. of southern Italy and islands, due to the relevance of the evergreen sclerophyllous species in the floristic assemblage, fall in the class *Quercetea ilicis* Br.-Bl. in Br.-Bl., Roussine et Nègre 1952 (Brullo et al. 2001; Bacchetta et al. 2004; Brullo et al. 2008).

#76. Annex I Habitat: 91B0 Thermophilous *Fraxinus angustifolia* woods (Tesei G, Camilletti M, Allegrezza M)

EUNIS Classification system: T19B6 - Thermophilous *Fraxinus* forests (EUNIS terrestrial habitat classification 2021); G1.7C6 – Thermophilous *Fraxinus* woods (EUNIS Habitat Classification 2012)

Biogeographical Region: Continental

National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).

Phytosociological reference: *Salici apenninae-Fraxinetum oxycarpae* Allegrezza, Mentoni et Tesei 2010 subass. *quercetosum dalechampii* Allegrezza, Mentoni and Tesei 2010, *Lauro nobilis-Fraxinion angustifoliae* I. Kárpáti et V. Kárpáti 1961, *Populion albae* Br.-Bl. Ex. Tchou 1948, Populetalia albae Br.-Bl. Ex Tchou 1948, *Alno glutinosae-Populetea albae* P. Fukarek et Fabijanić 1968 (Mucina et al. 2016).

Geographic information: Italy, Marche, Ancona, Fabriano, 415 m a.s.l., Coordinates: 43.357843 N, 12.831927 E [Tab. 4, Rel. 6 in Allegrezza et al. (2010)]; 43.357615 N, 12.831786 E [Tab. 4, Rel. 7 in Allegrezza et al. (2010)].

Cells ID in the EEA reference grid: 10kmE455N225 (Suppl. Material 2, Figure S19).

Natura 2000 Site Code: currently not included in any Natura 2000 Site

Phytosociological table: Tab. 4, Rels 6 and 7 in Allegrezza et al. (2010).

Notes: the reported habitat, although not included within any N2000 site, falls within floristic area no. 43 "Prato umido presso Fabriano" where the presence of *Fraxinus oxycarpa* had already been reported. The floristic areas were established by the Marche Region (R.L. 52/74) with the aim of protecting natural environments where rare or endangered plants grow and are worthy of protection.

The *Salix apenninae-Fraxinetum oxycarpae* plant community refers to a mixed lowland woodland vegetation dominated by *Fraxinus oxycarpa* (=*Fraxinus angustifolia* subsp. *oxycarpa*) which is typically present on the accumulations of the silty-clayey blanket, characterised by relatively high humidity conditions and flat or slightly depressed morphology. The following species are considered characteristic and differential of the association: *Salix apennina*, *Populus canescens*, *Rubus caesius*, *Acer campestre*, *Prunus avium* and *Fraxinus ornus*. The subassociation quercetosum dalechampii differs from the typical one and refers to *Fraxinus oxycarpa* forests present along the poorly incised ditches with a typically seasonal regime (dry for most of the year) that run through cultivated fields. In this community, *Fraxinus oxycarpa* is present in the dominate layer while the dominated layer is characterised by the constant presence of *Ulmus minor*. *Quercus dalechampii*,

Ligustrum vulgare and *Brachypodium sylvaticum* are indicated as differential species of the subassociation *quercetosum dalechampii* (Allegrezza et al. 2010).

#77. Annex I Habitat: 91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) (Gianguzzi L, Sciandrello S, Bazan G)

EUNIS Classification system: G1.131 - Southern *Alnus glutinosa* galleries
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Platano orientalis-Alnetum glutinosae* (Brullo et Spampinato 1990) Sciandrello et al. 2023; *Osmundo regalis-Alnion glutinosae* (Br.-Bl. et al. 1956) Dierschke and Rivas-Martínez 1975; *Populetalia albae* Br.-Bl. ex Tchou 1948, *Alno glutinosae-Populetea albae* P. Fukarek et Fabijanić 1968.
Geographic information: Italy, Sicily, Fondachelli Fantina (ME), Fiumara Madridi, 450 m a.s.l., Coordinates: 38.006454 N, 15.194476 E (Suppl. Material 1, Table S13, Rel. 1); Italy, Sicily, Fondachelli Fantina (ME), Fiumara Madridi, 490 m a.s.l., Coordinates: 37.996369 N, 15.189085 E (Suppl. Material 1, Table S13, Rel. 2); Italy, Sicily, Santa Lucia del Mela (ME), Fiumara D'Agrò, 270 m a.s.l., Coordinates: 38.098094 N, 15.284146 E (Suppl. Material 1, Table S13, Rel. 3); Italy, Sicily, Santa Lucia del Mela (ME), Fiumara D'Agrò, 285 m a.s.l., Coordinates: 38.097861 N, 15.283677 E (Suppl. Material 1, Table S13, Rel. 4); Italy, Sicily, Antillo (ME), Affluente dell'Agrò in località Pinazzo, 280 m a.s.l., Coordinates: 37.975230 N, 15.240598 E (Suppl. Material 1, Table S13, Rel. 5);
Cells ID in the EEA reference grid: 110kmE478N167 (Suppl. Material 1, Table S13, Rels 1 and 5), 10kmE477N167 (Suppl. Material 1, Table S13, Rel. 2), 10kmE478N168 (Suppl. Material 1, Table S13, Rels 3 and 4), (Suppl. Material 2, Figure S20).
Natura 2000 Site Code: Rels 1-2 in Table 14 currently are not included in any Natura 2000 site; Rels 3-4 in Table 14 are included in the ZSC ITA030007 "Affluenti del Torrente Mela"; Rel. 5 in Table 14 is included in the ZSC ITA030019 "Tratto Montano del Bacino della Fiumara di Agrò" (Suppl. Material 2, Figure S20).
Phytosociological table: Suppl. Material 1, Table S13, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).
Notes: A recent study on riparian vegetation dominated by Alnus glutinosa L. in Italy and the Tyrrhenian Islands (Sciandrello et al. 2022) provides a syntassonomic and distributional overview of the different plant communities identified there. These communities are classified within the order *Populetalia albae* Br.-Bl. ex Tchou 1948 (class *Alno glutinosae-Populetea albae* P. Fukarek et Fabijanic 1968), which is further divided into the alliances *Ligustro vulgaris-Alnion glutinosae* Poldini, Sburlino and Venanzoni 2015 in Biondi et al. 2015 (riparian meso-thermophilous forests of the submediterranean regions of the Northern and Central Apennine Peninsula) and *Osmundo regalis-Alnion glutinosae* (Br.-Bl. et al. 1956) Dierschke and Rivas-Martínez in Rivas-Martínez 1975 (with an Iberian-Atlantic-Mediterranean distribution). The latter is divided into the sub-alliances *Struthioptero-Alnenion glutinosae* Sciandrello et al. 2022 (thermo-mesophilous communities of central Italy, up to the mountains of Sardinia and Corsica) and *Hyperico hircini-Alnenion glutinosae* Dierschke 1975 (thermophilous communities with a circum-Tyrrhenian distribution: Corsica, Sardinia, Tyrrhenian coasts of the Italian peninsula, and northeastern Sicily). These last Sicilian formations are limited to the Peloritani Mountains, where they are attributed to the association *Platano orientalis-Alnetum glutinosae* (Brullo and Spampinato 1990) by Sciandrello et al. 2022 (Suppl. Material 2, Figure S21). The most interesting nuclei are located on the Tyrrhenian slope, particularly in the upper part of the hydrographic basin of the Fiumara d'Agrò, in the territory of Antillo (Torrente Fonderia, C.de Pianammare, Rosignolo, Pinazzo, etc.), as well as in the rivers S. Paolo (Francavilla di Sicilia) and Alcantara. Other almost punctiform and floristically impoverished nuclei are also present on the Tyrrhenian slope, particularly in the Fiumara Madridi (Fondachelli Fantina) and in the Torrente Mela (S. Lucia del Mela). Overall, these are relict nuclei, just like other formations and/or species also linked to watercourses or humid environments of the Peloritani Mountains (Brullo and Spampinato 1990; Sciandrello et al. 2015), as well as the Nebrodi Mountains (Brullo et al. 1976; De Castro et al. 2015; Gianguzzi et al. 2021; Gianguzzi and La Mantia 2004) and other reliefs of the northern ridge of Sicily (Raimondo et al. 1994; Brullo and Brullo 2021; Gianguzzi et al. 2013).

#78. Annex I Habitat: 91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) (Morabito A, Musarella CM, Spampinato G)

EUNIS Classification system: T14B13 (formerly, G1.1313): Western Mediterranean alder and ash-alder galleries (Chytrý et al. 2020).
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Ligustro vulgaris-Alnion glutinosae* Poldini, Sburlino and Venanzoni 2015 in Biondi et al. 2015, *Populetalia albae* Br.-Bl. ex Tchou 1948, *Salici purpureae-Populetea nigrae* (Rivas-Mart. et Cantó ex Rivas-Mart. et al. 1991) Rivas-Mart. et Cantó 2002 (Biondi and Blasi 2015).

Geographic information: Italy, Calabria, Catanzaro, Lamezia Terme, Caronte, 248 m a.s.l., Coordinates: 38.975917 N, 16.258431 E (Suppl. Material 1, Table S14, Rel.1); Italy, Calabria, Vibo Valentia, Brognaturo, Lacina, 1004 m a.s.l., Coordinates: 38.588022 N, 16.393328 E (Suppl. Material 1, Table S14, Rel.2); 1014 m a.s.l., Coordinates: 38.588147 N, 16.392011 E (Suppl. Material 1, Table S14, Rel.3); Italy, Calabria, Catanzaro, Serrastretta, Valle Apite, 607 m a.s.l., Coordinates: 38.975397 N, 16.427989 E (Suppl. Material 1, Table S14, Rel. 4); Calabria, Catanzaro, Girifalco, C. Pellegrini, 358 m a.s.l., Coordinates: 38.829164 N, 16.404547 E (Suppl. Material 1, Table S14, Rel. 5); Coordinates: 38.829097 N, 16.405750 E (Suppl. Material 1, Table S14, Rel. 6); Calabria, Vibo Valentia, Capistrano, Spicchiali, 666 m a.s.l., Coordinates: 38.699014 N, 16.324903 E (Suppl. Material 1, Table S14, Rel. 7); Calabria, Vibo Valentia, Filadelfia, Masone, 731 m a.s.l., Coordinates: 38.777242 N, 16.346686 E (Suppl. Material 1, Table S14, Rel. 8); Calabria, Vibo Valentia, Brognaturo, Lacina, 997 m a.s.l., Coordinates: 38.594142 N, 16.399900 E (Suppl. Material 1, Table S14, Rel. 9); 1001 m a.s.l., Coordinates: 38.594478 N, 16.399725 E (Suppl. Material 1, Table S14, Rel. 10); Calabria, Reggio Calabria, Scilla, F.ra di Favazzina, 41 m a.s.l., Coordinates: 38.259411 N, 15.763797 E (Suppl. Material 1, Table S14, Rel. 11); Calabria, Reggio Calabria, Molochio, T. Palata, 317 m a.s.l., Coordinates: 38.310544 N, 16.054958 E (Suppl. Material 1, Table S14, Rel. 12).
Cells ID in the EEA reference grid: 10kmE486N178 (Suppl. Material 1, Table S14, Rel. 1), 10kmE488N174 (Suppl. Material 1, Table S14, Rels 2–3 and 9–10), 10kmE488N178 (Suppl. Material 1, Table S14, Rel. 4), 10kmE487N177 (Suppl. Material 1, Table S14, Rels 5–6), 10kmE487N175 (Suppl. Material 1, Table S14, Rel. 7), 10kmE487N176 (Suppl. Material 1, Table S14, Rel. 8), 10kmE482N170 (Suppl. Material 1, Table S14, Rel. 11), 10kmE485N171 (Suppl. Material 1, Table S14, Rel. 12) (Suppl. Material 2, Figure S20).

Natura 2000 Site Code: currently not included in any Natura 2000 Site (Rels 1, 4, 5, 6, 7, 8, 10, 12 in Suppl. Material 1, Table S14), IT9340120 - "Lacina" (Rels 2, 3, 9 in Suppl. Material 1, Table S14). IT9350300 – "Costa Viola" (Rel. 11, in Suppl. Material 1, Table S14).

Phytosociological table: Suppl. Material 1, Table S14, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).

Notes: In accordance with Biondi et al. (2015) and Sciandrello et al. (2022) the riparian woodland with *Alnus glutinosa* of Calabria are referred to the *Ligustro vulgaris–Alnion glutinosae* Poldini, Sburlino and Venanzoni in Biondi et al. 2015, alliance that brings together the riparian meso-thermophilous forests dominated by *Alnus glutinosa* (L.) Gaertn. of *Populetalia albae* growing in the submediterranean regions of the Apennine Peninsula. The alder woods found occupy a wide altitude range and in some reliefs present invasive alien species such as *Robinia pseudoacacia* L., *Ailanthus altissima* (Mill.) Swingle and *Catalpa bignonioides* Walter, expanding species that compromise habitat conservation (Spampinato et al. 2022). These new records allow to expand the distribution area of habitat 91E0* in the Calabria Region, given the ecological importance recognized in the Habitats Directive of the European Union (European Commission 2013).

#79. Annex I Habitat: 91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) (Fanfarillo E, Fiaschi T, Cannucci S, Angiolini C)

EUNIS Classification system: G1.131 – Southern *Alnus glutinosa* galleries
Biogeographical Region: Mediterranean
National Habitat Checklist of reference:
Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Ligustro vulgaris-Alnion glutinosae* Poldini, Sburlino et Venanzoni in Biondi et al. 2015, *Populetalia albae* Br.-Bl. ex Tchou 1948, *Alno glutinosae-Populetea albae* P. Fukarek and Fabijanić 1968 (Mucina et al. 2016).
Geographic information: Italy, Tuscany, Siena, Castelnuovo Berardenga, 186 m a.s.l., Coordinates: 43.304447 N, 11.414165 E (Suppl. Material 1, Table S15, Rel.1).
Cell ID in the EEA reference grid: 10kmE443N224 (Suppl. Material 2, Figure S20).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Suppl. Material 1, Table S15, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).
Notes: The habitat was detected in the lower part of the Arbia River, where such forests represent remnants of naturalness within a human-altered riverscape where woods are mostly dominated by alien species due to human pressures (Angiolini et al. 2023).

#80. Annex I Habitat: 92A0 *Salix alba* and *Populus alba* galleries (Morabito A, Musarella CM, Spampinato G)

EUNIS Classification system: G1.314; T1424 (formerly) - Italic poplar galleries (Chytrý et al. 2020).
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Populion albae* Br.-Bl. ex Tchou 1948, *Populetalia albae* Br.-Bl. ex Tchou 1948, *Salici purpureae-Populetea nigrae* Rivas-Martínez & Cantó ex Rivas-Martínez, Báscones, T.E. Díaz, Fernández-González & Loidi 2001 (Biondi and Blasi 2015).
Geographic information: Italy, Calabria, Catanzaro, Lamezia Terme, Caronte, 210 m a.s.l., Coordinates: 38.970150 N, 16.258033 E (Suppl. Material 1, Table S16, Rel. 1)

Cells ID in the EEA reference grid: 10kmE486N178 (Suppl. Material 2, Figure S22).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Suppl. Material 1, Table S16, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).
Notes: The riparian vegetation with white willow is a particular azonal formation growing along the Calabrian watercourses with silty sandy floods, variable flow and high level of the aquifer (Brullo and Spampinato 1997). These riparian forests, which belong to the Populion albae alliance, are composed of deciduous softwood species such as willows, poplars, and alders, and are widespread mainly in the hilly and submontane belt of the region, being linked by a macrobioclimate between thermo- and mesomediterranean (Brullo et al. 2001).

#81. Annex I Habitat: 92D0 Southern riparian galleries and thickets (*Nerio-Tamaricetea* and *Securinegion tinctoriae*) (Patera G)

EUNIS Classification system: F9.31 - [*Nerium oleander*], [*Vitex agnus-castus*] and [*Tamarix*] galleries
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Tamarici africanae-Viticetum agni-casti* Brullo and Spampinato 1997, *Rubo ulmifolii-Nerion oleandri* Bolos 1985, *Tamaricetalia africanae* Br.-Bl. and O. Bolòs 1958, *Nerio oleandri-Tamaricetea africanae* Br.-Bl. and O. Bolòs 1958 (Biondi and Blasi 2015).
Geographic information: Italy, Campania, Salerno, Centola, 34 m a.s.l., Coordinates: 40.085320 N, 15.349371 E (Suppl. Material 1, Table S17, Rel. 1).
Cells ID in the EEA reference grid: 10kmE477N190 (Suppl. Material 2, Figure S23).
Natura 2000 Site Code: ZSC IT8050013 "Fiume Mingardo".
Phytosociological table: Suppl. Material 1, Table S17, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).
Notes: Riparian shrublands characterized by *Tamarix africana* grow on the pebbly edge in the terminal part of Mingardo river, on alluvial soils submerged only during floods (Suppl. Material 2, Figure S24). The cenoses detected is referred to *Tamarici africanae-Viticetum agni-casti*, a thermophilic association exclusive to the thermo-Mediterranean thermotype (Brullo and Spampinato 1997).

#82. Annex I Habitat: 9330 *Quercus suber* forests (Morabito A, Musarella CM, Spampinato G)

EUNIS Classification system: T211 (formerly G2.11) - *Quercus suber* forest (Chytrý et al. 2020).
Biogeographical Region: Mediterranean
National Habitat Checklist of reference: Italian Interpretation Manual of the Directive 92/43/EEC Habitats (Biondi et al. 2009).
Phytosociological reference: *Helleboro-Quercetum suberis* Signorello 1984; variante a *Myrtus communis* L. (Mercurio and Spampinato 2003), *Erico arboreae-Quercion ilicis* Brullo, Di Martino et Marcenò 1977; *Quercetalia ilicis* Br.-Bl. ex Molinier 1934; *Quercetea ilicis* Br.-Bl. in Br.-Bl., Roussine et Nègre 1952 (Biondi and Blasi 2015).
Geographic information: Italy, Calabria, Catanzaro, Gizzeria, Contrada Jacona, 75 m a.s.l., Coordinates: 38.953347 N, 16.179847 E (Suppl. Material 1, Table S18, Rel. 1); Italy, Calabria, Vibo Valentia, Capistrano, Contrada Bufalo, 579 m a.s.l., Coordinates: 38.683064 N, 16.292239 E (Suppl. Material 1, Table S18, Rel. 2); Italy, Calabria, Catanzaro, San Sostene, Contrada Bufalo, 580 m a.s.l., Coordinates: 38.638206 N, 16.510347 E (Suppl. Material 1, Table S18, Rel. 3).
Cells ID in the EEA reference grid: 10kmE485N178 (Suppl. Material 1, Table S18, Rel. 1), 10kmE487N175 (Suppl. Material 1, Table S18, Rel. 2), 10kmE489N175 (Suppl. Material 1, Table S18, Rel. 3) (Suppl. Material 2, Figure S25).
Natura 2000 Site Code: currently not included in any Natura 2000 Site.
Phytosociological table: Suppl. Material 1, Table S18, nomenclature and taxa delimitation according to Portal to the Flora of Italy (2023).
Notes: Italian cork oaks for their acidophilic species assemblage have been referred by Brullo and Marceno (1984) to the *Erico-Quercion ilicis*. This alliance groups forest associations dominated by evergreen sclerophyllous species with a high presence of calcifugous species, which develop on siliceous or strongly leached soils, in subhumid to humid Mediterranean macrobioclimates (Biondi and Blasi 2015). At the association level, the communities detected (Suppl. Material 1, Table S18, Rels 1-3) are to be ascribed to the *Helleboro-Quercetum suberis* Signorello 1984, community spread in Calabria region (Signorello 1984; Brullo et al. 2001) and in particular to the variant of *Myrtus communis* (Mercurio and Spampinato 2003) that group to the thermo-xerophilous cork oaks, located in the thermo-Mediterranean settled in more xeric environmental conditionsthan those typical of the association which instead is characterized by an assemblage of mesophilous species and bioclimatic conditions of meso-Mediterranean type. These new records expand the distribution area of the habitat 9330 in the Calabria Region.

Acknowledgements

This work was supported by the Fondazione di Sardegna project : "Verso una ricerca floristica di nuova generazione: dalla gap analysis alla valutazione della biodiversità con il supporto della citizen science". Simonetta Bagella as project holder.

Bibliography

Acosta ATR, Ercole S (2015) Gli habitat delle coste sabbiose italiane: ecologia e problematiche di conservazione. ISPRA, Serie Rapporti, 215/2015.

Allegrezza M, Tesei G, Mentoni M (2010) Geomorfologia e paesaggio vegetale: l'esempio della grande frana di Pescacci (Comune di Serra San Quirico – Appennino centrale). Fitosociologia 47(2): 57–97.

Angiolini C, de Simone L, Fiaschi T, Cifaldi GP, Maccherini S, Fanfarillo E (2023) Detecting the imprints of past clear-cutting on riparian forest plant communities along a Mediterranean river. River Research and Applications. https://doi.org/10.1002/rra.4152

Arrigoni PV, Nardi E, Raffaelli M (1985) La vegetazione del parco naturale della Maremma (Toscana). Università degli Studi di Firenze, Dip. di biologia vegetale.

Bacchetta G, Bagella S, Biondi E, Farris E, Filigheddu R, Mossa L (2004) A contribution to the knowledge of the order *Quercetalia ilicis* Br.-Bl. ex Molinier 1934 of Sardinia. Fitosociologia 41: 29–51.

Bartolo G, Brullo S, Signorello P (1989) La classe *Crithmo-Limonietea* nella penisola italiana. Colloques Phytosociologiques 19: 55–81.

Bazan G, Marino P, Guarino R, Domina G, Schicchi R (2015) Bioclimatology and vegetation series in Sicily: a geostatistical approach. Annales Botanici Fennici 52: 1–18. https://doi.org/10.5735/085.052.0202

Bazan G, Bacchetta G, Bagella S, Bonari G, Bonini F, Calvia G, Caria MC, Rivieccio G, Gianguzzi L (2021) New national and regional Annex I Habitat records: from # 21 to #25. Plant Sociology 58(1): 167-178. https://doi.org/10.3897/pls2021581/09

Biondi E, Blasi C (2015) Prodromo della vegetazione italiana. MATTM, SBI. Available online at www.prodromo-vegetazione-italia.org [accessed on 2023, May 26].

Biondi E, Blasi C, Burrascano S, Casavecchia S, Copiz R, Del Vico E, et al. (2009) Manuale Italiano di interpretazione degli habitat della Direttiva 92/43/CEE. Società Botanica Italiana. Ministero dell'Ambiente e della tutela del territorio e del mare, D.P.N. Available online at http://vnr.unipg.it/habitat/ [accessed on 2023, May 26].

Brullo C, Brullo S (2021) Flora endemica illustrata della Sicilia. Laruffa Editore, Reggio Calabria, pp. 427.

Brullo S, Gianguzzi L, La Mantia A, Siracusa G (2008). La classe *Quercetea ilicis* in Sicilia. Bollettino dell'Accademia Gioenia di Scienze Naturali 41(369): 1–24.

Brullo S, Scelsi F, Spampinato G (2001). La Vegetazione dell'Aspromonte.; Laruffa: Reggio Calabria, Italy.

Brullo S, Marcenò C (1984).Contributo alla conoscenza della classe *Quercetea ilicis* in Sicilia. Not. Fitosoc. 19(1): 18–22.

Brullo S, Marceno' C, (1979) *Dianthion rupicolae* nouvelle alliance sud-tyrrhénienne des *Asplenietalia glandulosi*. Doc. Phytosoc. n.s., 4: 131–146.

Brullo S, Di Martino A, Marcenò C (1976) La vegetazione di Pantelleria (Studio fitosociologico). Pubbl. Ist. Bot. Univ. Catania, pp. 111.

Brullo S, Spampinato G (1997) Indagine fitosociologica sulle ripisilve della Calabria (Italia meridionale). Lazaroa 18: 105–151

Brullo S, Spampinato G (1990) La vegetazione dei corsi d'acqua della Sicilia. Accademia Gioenia Scienze Naturali Catania 23(336): 119–252.

Caneva G, De Marco G, Mossa L (1981) Analisi fitosociologica e cartografia della vegetazione (1:25.000) dell'isola di S. Antioco (Sardegna sud-occidentale). C.N.R. AQ/1/124: 1–59.

Chytrý M, Tichý L, Hennekens SM, Knollová I, Janssen JA, Rodwell JS et al. (2020) EUNIS Habitat Classification: Expert system, characteristic species combinations and distribution maps of European habitats. Applied Vegetation Science 23: 648–675. https://doi.org/10.1111/avsc.12519

De Castro O, Colombo P, Gianguzzi L, Perrone R (2015) Flower and fruit structure of the endangered species *Petagnaea gussonei* (Sprengel) Rauschert (Saniculoideae, Apiaceae) and implications for its reproductive biology. Plant Biosystems 149 (6): 1042-1051. https://doi.org/10.1080/11263504.2015.1014007

De Dominicis V, Casini S, Mariotti M, Boscagli V (1988) La vegetazione di Punta Ala (Prov. Di Grosseto). Webbia 42(1): 101–143. https://doi.org/10.1080/00837792.1988.10670430

Di Pietro R, Conte AL, Di Marzio P, Fortini P, Farris E, Gianguzzi L, Müller M, Rosati L, Spampinato G, Gailing O (2021) Does the genetic diversity among pubescent white oaks in southern Italy, Sicily and Sardinia islands support the current taxonomic classification. European Journal of Forest Research 140: 355–371. https://doi.org/10.1007/s10342-020-01334-z

Di Pietro R, Conte AL, Di Marzio P, Gianguzzi L, Spampinato G, Caldarella O, Fortini P (2020). A multivariate morphometric analysis of diagnostic traits in southern Italy and Sicily pubescent oaks. Folia Geobotanica 55: 163–183. https://doi.org/10.1007/s12224-020-09378-0

Eionet (2013–18). Article 17 web tool. Available at https://nature art17.eionet.europa.eu/article17/habitat/summary [accessed on 2023, May 12].

Eionet (2019). Eionet Central Data Reporitory. https://cdr.eionet.europa. eu/it/eu/art17/envxuwp6g/ [accessed on 2023, May 25].

European Commission (2013). Interpretation manual of European Union Habitats—EUR28. European Commission DG Environment: Brussels, Belgium pp. 1–144.

Fanfarillo E, Fiaschi T, Castagnini P, de Simone L, Angiolini C (2023) Vegetation and Annex I habitats of a suburban river in southern Tuscany (central Italy): remnants of plant diversity or need for restoration? Hacquetia. https://doi.org/10.2478/hacq-2022-0016

Fiaschi T, Fanfarillo E, Maccherini S, Bacaro G, Bonari G, Foggi B, et al. (2023) Effectiveness of different metrics of floristic quality assessment: The simpler, the better? Ecological Indicators 149: 110151. https://doi.org/10.1016/j.ecolind.2023.110151.

Gianguzzi L, Caldarella O, D'Amico A, Migliore S (2021) Nuovi dati sulla distribuzione e l'ecologia di Petasites hybridus subsp. hybridus (Asteraceae) in Sicilia. In Domina G, Bernardo L, De Castro O, Orsenigo S, Roma-Marzio F (a cura di), Mini lavori della Riunione scientifica annuale del Gruppo per la Floristica, Sistematica ed Evoluzione, 12 novembre 2021, Online. Notiziario della Società Botanica Italiana 5(2): 207–250, pp. 229–230.

Gianguzzi L, Bagella S, Bazan G, Caria MC, Cerabolini BEL, Dalla Vecchia A, Rivieccio G, Bolpagni R (2020) New national and regional Annex I Habitat records: #13 to #15. Plant Sociology 57(1): 65–74. https://doi.org/10.3897/pls2020571/07

Gianguzzi L, Cusimano D, Ilardi V, Romano S (2013) Distribution, ecology, vegetation and conservation survey on the relictual population of Carex panormitana Guss. (Cyperaceae) in Sicily (Italy). Webbia: Journal of Plant Taxonomy and Geography 68(2): 159–175. https://doi.org/10.1080/00837792.2013.853364

Gianguzzi L, La Mantia A (2004) Osservazioni fitosociologiche, sinecologiche e sincorologiche sulla vegetazione relittuale a *Petagnaea gussonei* (*Galio-Urticetea*) nell'area dei Monti Nebrodi (Sicilia nord-orientale). Fitosociologia 41(1): 165–180.

Giardina G, Raimondo M, Spadaro V (2007) A catalogue of plants growing in Sicily. Bocconea 20: 1–582.

Gigante D, Bagella S, Bonini F, Caria MC, Gabellini A, Gennai M, et al. (2019a) New national and regional Annex I Habitat records: #9-#12. Plant Sociology 56(2): 129–134. https://doi.org/10.7338/pls2019562/09

Gigante D, Allegrezza M, Angiolini C, Bagella S, Caria MC, Ferretti G et al. (2019b) New national and regional Annex I Habitat records: #1-#8. Plant Sociology 56(1): 31–40. https://doi.org/10.3897/pls2020572/05

Gigante D, Maneli F, Venanzoni R (2013) Mediterranean temporary wet systems in inland Central Italy: ecological and phytosociological features. Plant Sociology 50(2): 93–112. https://doi.org/10.7338/pls2013502/06

Gigante D, Acosta ATR, Agrillo E, Attorre F, Cambria VM, Casavecchia S et al. (2012) VegItaly: Technical features, crucial issues and some solutions. Plant Sociology 49(2): 71–79. http://www.doi.org/10.7338/pls2012492/05

Gigante D, Maneli F, Venanzoni R (2007) L'eco-mosaico degli stagni temporanei nella Piana di Ferretto (Perugia, Italia centrale): un Habitat prioritario della Direttiva 92/43/CEE. Riv. Idrobiol., 43(2004-2007): 148–158. Aracne Ed., Roma.

Landucci F, Acosta ATR, Agrillo E, Attorre F, Biondi E, Cambria VM et al. (2012) VegItaly: The Italian collaborative project for a national vegetation database. Plant Biosystems 146(4): 756–763. https://doi.org/10.1080/11263504.2012.740093

Marino P, Guarino R, Bazan G (2012) The Sicilian taxa of *Genista* sect. Voglera and their phytosociological framework. Flora Mediterranea 22: 169–190. https://doi.org/10.7320/FlMedit22.169

Mercurio R, Spampinato G (2003) Primo contributo alla definizione tipologica delle sugherete della Calabria. S.I.S.E.F., Atti 3, pp. 483–490.

Mucina L, Bültmann H, Dierßen K, Theurillat J-P, Raus T, Čarni A, et al. (2016) Vegetation of Europe: hierarchical floristic classification system of vascular plant, bryophyte, lichen, and algal communities. Applied vegetation science 19: 3–264.

Musarella CM, Cano-Ortiz A, Piñar Fuentes JC, Navas-Ureña J, Pinto Gomes CJ, Quinto-Canas R, Cano E, Spampinato G (2018) Similarity analysis between species of the genus *Quercus* L. (Fagaceae) in southern Italy based on the fractal dimension. PhytoKeys 113: 79–95. https://doi.org/10.3897/phytokeys.113.30330

Pedrotti F (1982) La vegetation des collines entre le Trasimene et le Val de Chiana. In: Pedrotti F. (Ed), Guide-Itineraire. Excursion Internationale de Phytosociologie en Italie centrale: 482–492. Camerino.

Pignatti S, Guarino R, La Rosa M (2017-2019) Flora d'Italia 2nd edition. Vols.1-4. Edagricole, Edizioni Agricole di New Business Media, Bologna.

Portale della Flora d'Italia (2023) Available online at http://dryades.units.it/floritaly/ [accessed on 2023, May 26].

QGIS.org (2023) QGIS Geographic information System. Open Source Geospatial Foundation Project. v3.16.

Raimondo FM, Gianguzzi L, Ilardi V (1994) Inventario delle specie "a rischio" nella flora vascolare nativa della Sicilia. Quad. Bot. Ambientale Appl. 3 (1992): 65–132.

Rivas-Martínez S, Fernández-González F, Loidi J, Lousã M, Penas, Á (2001). Vascular plant communities of Spain and Portugal. Itinera Geobotanica 14: 5–341.

Rivieccio G, Angiolini C, Azzella MM, Bagella S, Bonari G, Bonini F, et al. (2022) New national and regional Annex I Habitat records: from #45 to #59. Plant Sociology 59(2): 71–98. https://doi.org/10.3897/pls2022592/06

Rivieccio G, Aleffi M, Angiolini C, Bagella S, Bazan G, Bonini F et al. (2021) New national and regional Annex I Habitat records: from# 26 to# 36. Plant Sociology 58(2): 77–98. https://doi.org/10.3897/pls2021582/07

Rivieccio G, Bagella S, Bazan G, Bonini F, Caria MC, Dagnino D, Mariotti M, Turcato C, Gianguzzi L (2020) New national and regional Annex I Habitat records: from #16 to #20. Plant Sociology 57(2): 133–144. https://doi.org/10.3897/pls2020572/05

Sciandrello S, Angiolini C, Bacchetta G, Cutini M, Dumoulin J, Fois M, et al. (2022) *Alnus glutinosa* Riparian Woodlands of Italy and Corsica: Phytosociological Classification and Floristic Diversity. Land 12(1): 88. https://doi.org/10.3390/land12010088

Sciandrello S (2020) Coastal saltmarsh vegetation in Sicily (Italy): phytosociological insights and plant diversity. Plant Biosystems 154(6): 860–876. https://doi.org/10.1080/11263504.2020.1779842

Sciandrello, S, Guarino R, Minissale P, Spampinato G (2015) The endemic vascular flora of Peloritani Mountains (NE Sicily): Plant functional traits and phytogeographical relationships in the most isolated and fragmentary micro-plate of the Alpine orogeny. Plant Biosystems 149: 838–854. https://doi.org/10.1080/11263504.2014.908978

Signorello P (1984) Osservazioni fitosociologiche su alcuni aspetti boschivi dei *Quercetea ilicis* dell'Italia meridionale. Not.Fitosoc. 19(1): 177–182.

Spampinato G, Laface VLA, Posillipo, G, Cano Ortiz A, Quinto Canas, Musarella CM (2022). Alien flora in Calabria (Southern Italy): An updated checklist. Biol. Invasions 24: 2323–2334. https://doi.org/10.1007/s10530-022-02800-y

Stinca A, Musarella CM, Rosati L, Laface VLA, Licht W, Fanfarillo E, et al. (2021) Italian vascular flora: New findings, updates and exploration of floristic similarities between regions. Diversity 13(11): 600. https://doi.org/10.3390/d13110600

Tavilla G, Angiolini C, Bagella S, Bonini F, Cambria S, Caria MC, et al. (2022) New national and regional Annex I Habitat records: from #37 to #44. Plant Sociology 59(1): 49–66. https://doi.org/10.3897/pls2022591/05

Supplementary material 1

Tables S1–S18

Authors: Antonio Morabito, Marina Allegrezza, Claudia Angiolini, Simonetta Bagella, Giuseppe Bazan, Federica Bonini, Matteo Camilletti, Silvia Cannucci, Maria Carmela Caria, Alessandro Crisafulli, Leopoldo de Simone, Assunta Esposito, Emanuele Fanfarillo, Emmanuele Farris, Massimiliano Ferrarato, Tiberio Fiaschi, Lorenzo Gianguzzi, Daniela Gigante, Riccardo Guarino, Vincenzo Ilardi, Michele Lonati, Andrea Mainetti, Francesco Mascia, Giacomo Mei, Carmelo Maria Musarella, Glauco Patera, Veronica Ranno, Maria Ravo, Saverio Sciandrello, Giovanni Spampinato, Adriano Stinca, Gianmarco Tavilla, Giulio Tesei, Giovanni Rivieccio

Data type: tables

Explanation note: Phytosociological tables

Copyright notice: This dataset is made available under the Open Database License (http://opendatacommons.org/licenses/odbl/1.0). The Open Database License (ODbL) is a license agreement intended to allow users to freely share, modify, and use this Dataset while maintaining this same freedom for others, provided that the original source and author(s) are credited.

Link: https://doi.org/10.3897/pls2023601/05.suppl1

Supplementary material 2

Figures S1–S25

Authors: Antonio Morabito, Marina Allegrezza, Claudia Angiolini, Simonetta Bagella, Giuseppe Bazan, Federica Bonini, Matteo Camilletti, Silvia Cannucci, Maria Carmela Caria, Alessandro Crisafulli, Leopoldo de Simone, Assunta Esposito, Emanuele Fanfarillo, Emmanuele Farris, Massimiliano Ferrarato, Tiberio Fiaschi, Lorenzo Gianguzzi, Daniela Gigante, Riccardo Guarino, Vincenzo Ilardi, Michele Lonati, Andrea Mainetti, Francesco Mascia, Giacomo Mei, Carmelo Maria Musarella, Glauco Patera, Veronica Ranno, Maria Ravo, Saverio Sciandrello, Giovanni Spampinato, Adriano Stinca, Gianmarco Tavilla, Giulio Tesei, Giovanni Rivieccio

Data type: maps and photos

Explanation note: Figures with the new cells distribution in Italy and maps with closeup pictures of vegetation types

Copyright notice: This dataset is made available under the Open Database License (http://opendatacommons.org/licenses/odbl/1.0). The Open Database License (ODbL) is a license agreement intended to allow users to freely share, modify, and use this Dataset while maintaining this same freedom for others, provided that the original source and author(s) are credited.

Link: https://doi.org/10.3897/pls2023601/05.suppl2